

CLAIMS

What is claimed is:

1. A lens structure comprising:
5 a surface devoid of cusps that includes a seamless profile;
wherein the surface includes a plurality of convex elements and concave
elements; and
wherein the convex elements include a positive surface curvature area and
wherein the concave elements include a negative surface curvature
10 area.
2. The lens structure of claim 1 further comprising:
a plurality of cells;
wherein the cells include an array of alternating convex elements and
15 concave elements.
3. The lens structure of claim 2 wherein each cell includes a rectangular shape.
4. The lens structure of claim 2 wherein each cell includes a hexagonal shape.
20
5. The lens structure of claim 1 wherein the surface includes a continuous
wave structure.
6. The lens structure of claim 2 wherein each cell includes at least two
25 orthogonal waves.
7. The lens structure of claim 2 wherein each cell includes at least three waves
that are separated by 120 degrees.

8. The lens structure of claim 1 wherein the lens structure includes a plurality of close packed hexagonal array of lenslets that include near circular symmetry.

5

9. The lens structure of claim 1 further comprising:
a filtering surface for producing a controlled amount of spherical aberration.

10. The lens structure of claim 9 wherein the filtering surface includes at least a
10 first region for producing over-corrected spherical aberration and at least a second region for producing under-corrected spherical aberration.

11. The lens structure of claim 10 wherein the first region has a first slope error and the second region has a second slope error.

15

12. The lens structure of claim 9 wherein the filtering surface includes a plurality of first regions for producing over-corrected spherical aberration and a plurality of second regions for producing under-corrected spherical aberration; wherein the first regions and the second regions are approximately equal in area
20 and wherein the first regions and second regions are uniformly distributed over the filtering surface.

13. The lens structure of claim 9 wherein the filtering surface performs low pass filtering.

25

14. The lens structure of claim 1 wherein the surface profile includes one of a plurality of circular arcs and a plurality of sinusoids.

15. The lens structure of claim 1 wherein the surface profile includes at least one aspheric function.

16. A lens structure comprising:

5 a plurality of cells;

wherein each cell includes a surface that is devoid of cusps and that includes a seamless profile;

wherein the cells includes include at least one convex element and at least one concave element; and

10 wherein the surface produces a controlled amount of under-corrected spherical aberration and over-corrected spherical aberration.

17. The lens structure of claim 16

wherein the convex element includes a positive surface curvature area and

15 wherein the concave element include a negative surface curvature area; and

wherein the cells include an array of alternating convex elements and concave elements.

18. A lens structure comprising:

20 a surface that includes at least a first region for producing over-corrected spherical aberration and at least a second region for producing under-corrected spherical aberration;

wherein the surface produces a controlled amount of under-corrected spherical aberration and over-corrected spherical aberration.

25 19. The lens structure of claim 18 wherein the surface is for performing a filtering function.

20. The lens structure of claim 18 wherein the surface is derived from a prototype un-filtered surface.